15.0 CUMULATIVE IMPACTS

This chapter describes the potential cumulative impacts of the Proposed Action Alternative together with the incremental impacts of the Alternative Action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The chapter includes the methods of analysis and a summary of the cumulative impacts by resource area.

15.1 Introduction

The Council on Environmental Quality (CEQ) regulations implementing the procedural provisions of the NEPA define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 Code of Federal Regulations [CFR] Part 1508.7). The regulations further explain that "cumulative effects can result from individually minor but collectively significant actions taking place over a period of time." The cumulative effects analysis presented in this CT EIS is based on the potential effects of land conveyance and transfer when added to common issues and their effects in the regions of influence (ROIs) for each resource resulting from past, present, and reasonably foreseeable future actions.

Based on examination of the potential direct and indirect environmental impacts of the conveyance and transfer, the potential impacts of other DOE and LANL actions, and the potential impacts of other actions in the region; the DOE has examined each of the following resource areas for cumulative effects: land use, transportation, infrastructure, noise, visual resources, socioeconomics, ecological resources, cultural resources, geology and soils, water resources, air resources and global climate change, human health, and environmental justice. Critical cumulative issues related to utility supply and infrastructure are outlined in greater depth. This chapter provides a brief summary description of cumulative impacts resulting from the conveyance or transfer of the subject 10 land tracts included in the impact analysis presented in Chapter 5 through Chapter 14, a brief overview of other DOE activities at LANL, and other regional activities.

15.2 Methods of Analysis

The DOE assessed cumulative effects by combining three elements: anticipated LANL activities, anticipated development activities (primarily in Los Alamos County), and projected development subsequent to disposition of the 10 land tracts.

Anticipated LANL activities are those presented in the LANL SWEIS (DOE 1999c) for the Preferred Alternative. The SWEIS Preferred Alternative provides a reasonable upper limit of impacts from LANL operations, and has been selected as the level of LANL operations assumed for both the CT EIS No Action Alternative and the CT EIS Proposed Action Alternative. (Slight adjustments were made for a reduced scale for the low energy demonstration accelerator [LEDA] at the Los Alamos Neutron Science Center [LANSCE].) For the CT EIS, it has been assumed that the adjusted SWEIS Preferred Alternative has already been fully implemented.

The impacts of anticipated regional development activities also have been included in the cumulative impacts analysis. In Los Alamos County, there are 10 residential development projects in various stages of planning or construction. These include Ponderosa Estates, Los Pueblos Road, North Mesa, Quezemon, Arrowhead Subdivision, 2500 Central Avenue, the Middle School Site, the Canyon Rim Site, and Dormitory Housing in the Los Alamos townsite and environs, and the White Rock School Site. Upon completion, these residential developments would result in approximately 1,300 new dwelling units and an estimated 3,300 new residents. There also are plans for development of a Research Park on about 60 acres (24 hectares) of land leased from the DOE; the park would employ 1,500 people. For the cumulative impacts analysis, it has been assumed that all of these developments, both residential and commercial, have been fully implemented.

The third element included in this cumulative impacts assessment is the projected development subsequent to disposition of the 10 land tracts. Four of the land tracts (Miscellaneous Site 22, Miscellaneous Manhattan Monument, Technical Area [TA] 74, and White Rock Y Tracts) have no development plans, regardless of whether the County or San Ildefonso Pueblo were to receive the tract. A single contemplated land use has been identified for two others tracts, the TA 21 and Airport Tracts. Two potential land uses have been identified for the remaining tracts. For tracts with two possible land uses, each resource area assumed the development scenario that would have the most consequences. For example, both residential and commercial development land uses are possible for the DOE LAAO Tract. Residential development of the DOE LAAO Tract would result in more demand for utilities, more traffic, and more carbon dioxide emissions than would the commercial development scenario of continued use of the existing office building by others than the DOE. Accordingly, residential development of the DOE LAAO Tract was assumed when examining the cumulative impacts for utilities, transportation, and global climate change.

For each resource area, the analysis begins with a description of the potential impacts on the resource that may occur from past, present, and reasonably foreseeable regional projects, activities, and agency plans. This analysis is followed a description of the potential impacts for the conveyance or transfer scenario that represents the maximum level of potential impacts for that resource. **This methodology results in a conservative analysis that overstates potential impacts that may occur in the next 10 years** (see Section 4.1 in Chapter 4). Potential cumulative impacts are defined with an assessment of the context and intensity of the impacts and the incremental contribution of the conveyance or transfer to regional cumulative effects.

15.3 Cumulative Impacts by Resource Area

The following sections present descriptions of cumulative impacts by resource area. For comparison purposes Table 15.3-1 is provided, summarizing cumulative impacts for each resource area.

15.3.1 Land Use

Cumulative impacts to land use are assessed by comparing the compatibility of anticipated changes in land use to existing adjacent land uses, management plans, policies, and practices. Cumulative impacts to land use occur when the net effect of incremental impacts would conflict with established land uses in the region, disrupt or divide established land use configurations, represent a substantial change in land use

Table 15.3-1. Summary of Cumulative Effects Within the Region of Influence

RESOURCE AREA	CT EIS PROPOSED ACTION ALTERNATIVE	LANL ACTIVITIES	OTHER REGIONAL ACTIVITIES	TOTAL POTENTIAL IMPACT
Land Use	Maximum of 826 acres (335 hectares) would be developed or redeveloped. Potential for introduction of land uses incompatible with adjacent resource protection efforts. Loss of recreational opportunities under some scenarios.	No changes outside LANL boundaries. Within LANL, environmental restoration activities may change land use.	Land use would change in several locations in the Los Alamos/White Rock area where residential developments are currently in various stages of planning or construction. Other commercial, industrial, and residential development projects would be anticipated in Los Alamos, Rio Arriba, and Santa Fe Counties. In addition, a research park covering about 60 acres (24 hectares) of land leased from the DOE also is being planned.	Development or alteration of over 826 acres (335 hectares) would change the land uses from primarily forest or woodlands to residential, commercial, or industrial uses.
Transportation	Peak hour traffic entering or exiting all 10 tracts could increase by a range of approximately 751 to 3,775 trips in ROI commuter traffic.	Potential increase in local traffic from increase of up to 1,400 full-time employees.	New residential development could cause increases in local traffic.	Increases in local traffic could be substantial and could overload existing roads, thus requiring road improvements.
Infrastructure	Cumulative usage increases would be • Electricity use: 32 gwh • Peak power: 6 mw • Natural gas: 459 mcf (13,000 mly) • Water: 382 mgy (1,446 mly) • Solid waste: 2,385 tpy (2,163 mty) Increases in discharges to wastewater treatment plants could be 132 mgy (500 mly) for the Bayo Wastewater Treatment Plant and 41 mgy (155 mly) for the White Rock Wastewater Treatment Facility.	Maximum cumulative uses are • Electricity use: 693 gwh • Peak power: 100 mw • Natural gas: 2,020 mcf (57,200 mly) • Water: 740 mgy (2,802 mly) • Solid waste: 3,160 tpy (2,867 mty) Potential cumulative wastewater discharge to the SWSC is 187 mgy (708 mly).	Estimated maximum cumulative uses, including increases from current developments and the research park would be • Electricity use: 106 gwh • Peak power: 16 mw • Natural gas: 1,253 mcf (35,530 mly) • Water: 1,111 mgy (4,214 mly) • Solid waste: 17,821 tpy (16,161 mty) Potential wastewater discharges to the SWSC and, Bayo and White Rock wastewater treatment plants are 199, 425, and 151 mgy (753, 1,609, and 572 mly), respectively.	Total anticipated uses would exceed the capacity for peak power supply, water rights, and the Bayo Wastewater Treatment Plant. Estimated local landfill life would be reduced to 5.5 years. The Bayo Wastewater Treatment Plant's capacity would be exceeded by 57 mgy (216 mly).

Table 15.3-1. Summary of Cumulative Effects Within the ROI (Continued)

RESOURCE AREA	CT EIS PROPOSED ACTION ALTERNATIVE	LANL ACTIVITIES	OTHER REGIONAL ACTIVITIES	TOTAL POTENTIAL IMPACT
Noise	Ambient noise levels would increase above current levels for most of the contemplated land uses. Ambient noise levels associated with cultural preservation, natural areas, and current transportation and utility corridors would remain about the same. Demolition and construction activities temporarily would elevate noise levels to a range of 74 to 95 dBA. Residential uses typically would result in ambient noise levels between 50 and 70 dBA, and commercial and industrial land uses typically would result in 60 to 70 dBA. Noise would be present during a greater part of the day on developed tracts, and overall noise from vehicular traffic would increase.	Temporary and minor noise is associated with construction on LANL property. Impacts from noise and vibration associated with explosives testing would be similar to those currently experienced.	Noise effects would be similar to those described for the CT EIS Proposed Action Alternative.	Ambient noise would increase in local areas due to construction and increased motor traffic, but would not add appreciably to overall noise levels. In most tracts, noise would occur more often than at present.
Visual Resources	The objectives of the scenic classes associated with the tracts would be met. Generally, the existing visual values would be maintained.	No changes except for new lighting associated with a new transportation corridor on LANL property.	Effects to visual resources would be similar to those described for the CT EIS Proposed Action Alternative.	Impacts to visual resources would be minimal.

Table 15.3-1. Summary of Cumulative Effects Within the ROI (Continued)

RESOURCE AREA	CT EIS PROPOSED ACTION ALTERNATIVE	LANL ACTIVITIES	OTHER REGIONAL ACTIVITIES	TOTAL POTENTIAL IMPACT
Socioeconomic	Short-term economic gains from construction activities. Long-term gains depend on the intensity of development.	Increase of up to 4,230 people in the Tri-County area from increase in LANL employees under the SWEIS Preferred Alternative. Associated increase of $172 million in personal income.	Socioeconomic effects would be similar to those described for the CT EIS Proposed Action Alternative.	Both short-term and long-term beneficial economic effects would be expected from increased development. Overall impacts to employment, income, population and housing would be minor within the ROI, but would be concentrated in the Los Alamos area. Improvements would be expected in the regional tax base but, according to the County of Los Alamos, would probably not offset the loss of assistance payments.
Ecological Resources	Development footprints for the 10 tracts include approximately 770 acres (312 hectares) of relatively undisturbed habitat, primarily ponderosa pine forest and pinyon-juniper woodland. Contemplated uses would be expected to degrade large amounts adjacent habitat, including preferred habitat for the American peregrine falcon and the Mexican spotted owl.	Removal of up to 41 acres (17 hectares) of pinyon-juniper woodland habitat and 7 acres (3 hectares) of ponderosa pine-Gambel oak on LANL property. No significant ecological effects would be expected.	Development of previously undisturbed areas would cause habitat destruction.	Development of more than 818 acres (331 hectares) would degrade large amounts of wildlife habitat and would cause adverse impacts to ecological resources and could result in further fragmentation of habitat and disruption of wildlife migration corridors.
Cultural Resources	Development of 826 acres (335 hectares) and use of tracts for natural areas could result in physical destruction, damage, or alteration of cultural resources on the subject tracts and in adjacent areas. Potential loss of certain Federal protections for cultural resources on subject tracts could result.	Potential exists for effects to some prehistoric resources due to shrapnel or vibrations from explosives testing. Also, 15 sites potentially eligible for the National Register of Historic Places could be affected by the expansion of Area G.	Development of previously undisturbed areas could result in physical destruction, damage, or alteration of cultural resources.	Development of 826 acres (335 hectares) and use of conveyed or transferred tracts for natural areas could result in physical destruction, damage, or alteration of cultural resources. Potential loss of certain Federal protections for cultural resources on conveyed or transferred tracts could result.

Table 15.3-1. Summary of Cumulative Effects Within the ROI (Continued)

RESOURCE AREA	CT EIS PROPOSED ACTION ALTERNATIVE	LANL ACTIVITIES	OTHER REGIONAL ACTIVITIES	TOTAL POTENTIAL IMPACT
Geology and Soils	Development would disturb soils and increase runoff. No other impacts to geologic resources would be expected.	No impacts to geologic resources expected, except for minimal deposition of contaminants to soils.	Development of previously undisturbed areas would result in soil disturbance; but, no other impacts to geologic resources would be expected.	Cumulative impacts to geologic resources are not considered to be substantial.
Water Resources	An additional 382 mgy (1,446 mly) of groundwater could be used. Potential exists for degradation of surface water quality from construction activity and increased pollutant loads and surface runoff volumes from increase in impermeable areas. Placement and operation of new water wells to address increased demand could impact groundwater quality.	Potential cumulative groundwater usage is 740 mgy (2,800 mly). Surface water quality within LANL is not expected to change substantially.	Groundwater use estimations for Los Alamos County, including the current developments and the research park are 1,111 mgy (4,214 mly). Potential exists for degradation of surface water quality from construction activity and increased pollutant loads and surface runoff volumes from increase in impermeable areas.	Total anticipated uses would exceed the capacity for water rights by 533 mgy (2,020 mly). The additional water withdrawal would accelerate drawdown of the main aquifer and could seriously impact the amount of cheaply treatable water available. Potential for degradation of surface water quality during construction activities.
Air Resources	Increases expected in criteria pollutants from mobile sources and homes using natural gas or propane. Slight increase expected in emissions of hazardous air pollutants from industrial facilities. Contributions to global climate change would increase more than 25-fold due to motor vehicle traffic and residential use of fossil fuels.	Criteria and toxic pollutant emissions are not expected to exceed applicable standards or approach levels that could affect human health. Increases in criteria pollutants would be expected from additional mobile sources associated with increased employment.	Increases would be expected in criteria pollutants from mobile sources and homes using natural gas or propane. Slight increase would be expected in emissions of hazardous air pollutants from industrial facilities. Contributions to global climate change would increase due to motor vehicle traffic and residential use of fossil fuels.	Increases in criteria and toxic pollutant emissions would occur. The cumulative effect from these increases would not be expected to be major. Increased development would lead to additional artificial light and impacts to visibility of the night sky. Increased carbon dioxide and greenhouse gases are expected locally. These would represent a shift of impacts from other areas and would not be an important contributor to global climate change.

Table 15.3-1. Summary of Cumulative Effects Within the ROI (Continued)

RESOURCE AREA	CT EIS PROPOSED ACTION ALTERNATIVE	LANL ACTIVITIES	OTHER REGIONAL ACTIVITIES	TOTAL POTENTIAL IMPACT
Human Health	As many as 900 new residents could be brought into closer proximity to LANL facilities at the DOE LAAO and DP Road Tracts and another 2,200 residents and lodgers at the White Rock Tract. Commercial development could bring as many as 6,000 private-sector employees into existing radiation buffer zones at the DP Road, TA 21, and Airport Tracts. These developments would mean increased public exposure to radiological and chemical emissions from LANL normal operations and hypothetical accidents. A substantial increase in the public collective radiation dose and LCFs would result.	Fifty-seven excess latent cancer fatalities for the public are estimated to result from hypothetical accidents.	No substantial impacts to human health would be expected.	No substantial impacts to human health would be expected for normal operations. The latent cancer fatalities from hypothetical accidents would increase from about 57 excess latent cancer fatalities to approximately 98 excess latent cancer fatalities from LANL operations because of increased populations close to LANL facilities.
Environmental Justice	No direct adverse effects on minority or low-income populations. Indirect impacts could include disruption of traditional wood gathering activities or loss of traditional cultural properties, which may lead to environmental justice impacts.	No direct or indirect adverse effects on minority or low-income populations.	Because no other applicable Federal activities have been identified by the cumulative analysis, environmental justice issues do not arise.	No cumulative adverse effects on minority or low-income populations would be expected.

Notes: gwh = gigawatt-hours, mw = megawatt, mcf = million cubic feet, mly = million liters per year, mgy = million gallons per year, tpy = tons per year, mty = metric tons per year, SWSC = Sanitary Wastewater Systems Consolidation, dBA = A-weighted decibels

configurations, or would be inconsistent with adopted land use plans.

Past and present land use in the region is described in Chapter 3, Affected Environment. No specific changes in land use or impacts are anticipated for upcoming LANL activities, but completion of environmental restoration actions may allow the possibility of changes in future land use. These ongoing environmental restoration actions will require the treatment and/or removal of large quantities of various waste materials from LANL during the next 10 years. Treatment methods and disposition of these wastes will be addressed by separate NEPA review. In general, these actions are proceeding independently of the conveyance or transfer process; but the conveyance and transfer scenarios may influence decisions on the timing, cleanup levels, and the inclusion of certain buildings in environmental restoration activities. Table 15.3.1-1 summarizes the estimated waste volumes associated with environmental restoration activities for the 10 subject tracts, based on very preliminary site characterization. It should be emphasized that environmental restoration actions would proceed under the No Action Alternative. Other anticipated regional changes in land use include the development of forest, grazing, and open-space land for residential and commercial uses. Under the various conveyance and transfer scenarios, future land use patterns could change on several tracts, as described in Chapter 5 through Chapter 14.

Potentially important cumulative impacts of these changes in land use would include the loss of trail access and other recreational opportunities; the introduction of land uses that are incompatible with adjacent National Park Service (NPS), U.S. Forest Service (USFS), and LANL resource protection missions and plans; increased activity in proximity to protected wildlife habitat and cultural resources; and the net loss and further fragmentation of ecosystems, which would reduce the amount and quality of plant and animal habitat in the region. Population increases also would increase visitation at Bandelier National Monument (BNM) and require the expenditure of scarce financial resources to provide for more visitors' services and security.

While cumulative impacts to land use would affect only a small percentage of the total region, many of the anticipated impacts from actions would be concentrated in the vicinity of Los Alamos, LANL, and White Rock. Implementation of the various conveyance and transfer scenarios, especially those contemplated for the Rendija Canyon and the White Rock Tracts could be important contributors to cumulative impacts in this area.

15.3.2 Transportation

Cumulative impacts to transportation are assessed by combining the number of trips anticipated to be generated by the contemplated land uses and the infrastructure improvements required to accommodate increased traffic levels with the transportation impacts of other existing and planned developments.

The regional transportation infrastructure and capacities are described in Chapter 3, Affected Environment. Peak hourly traffic in the vicinity of LANL ranges from 114 (State Road [SR] 4) to 5,285 vehicles (SR 501) for onsite routes and ranges from 380 (SR 4) to 7,069 vehicles (U.S. 84/285) for regional routes. Some minor increases in worker trips and increased truck transport of hazardous chemical and radioactive materials are expected as a result of future LANL activities and increases in employment. Workers from the planned Research Park development and residents from the various residential developments would cause increases in the number of trips anticipated regionally. Under

Table 15.3.1-1. Estimated Environmental Restoration Waste Volumes

TRACT	CONTEMPLATED LAND USE	CLEANUP OF PRSs	D&D OF STRUCTURES	REMEDIATION OF CANYONS	MAJOR WASTE TYPE
Rendija Canyon	Cultural Preservation	7,500 (5,700)	--	0	Hazardous wastes from munitions
Rendija Canyon	Residential Development	7,500 (5,700)	--	0	Hazardous wastes from munitions
DOE LAAO	Commercial Development	90 (70)	300 (230)	--	Construction debris
DOE LAAO	Residential Development	230 (176)	3,190 (2,440)	--	Construction debris
Miscellaneous Site 22	Commercial Development	10 (8)	--	--	Construction debris
Miscellaneous Manhattan Monument	Cultural Preservation	--	--	--	No cleanup required
DP Road	Commercial/Industrial Development	810 (620)	2,220 (1,690)	0	RCRA hazardous wastes
DP Road	Residential/Commercial Development	750 (570)	2,220 (1,690)	0	RCRA hazardous wastes
TA 21	Commercial/Industrial Development	9,290 (7,090)	56,560 (43,220)	0	Construction debris
Airport	Commercial/Industrial Development	24,460 (18,690)	0	--	Solid waste from former landfill
White Rock Y	Cultural Preservation	--	0	3,770 (2,880)	Low-level radioactive canyon sediments
TA 74	Cultural Preservation	0	0	98,880 (74,910)	Low-level radioactive canyon sediments
White Rock	Cultural Preservation/ Commercial Development	--	0	0	No cleanup required
White Rock	Residential/Commercial Development	--		940 (720)	Low-level radioactive canyon sediments

Notes:

All volumes are cubic yards (followed by cubic meters).
PRSs = potential release sites
D&D = decontamination and decommissioning

Dash (--) indicates there are no PRSs, structures, or canyons.
Zero indicates that no wastes are expected to be generated.
RCRA = Resource Conservation and Recovery Act

the various conveyance or transfer scenarios, commercial, industrial, and residential developments would greatly increase the number of trips generated.

Potentially important cumulative impacts to regional transportation would include increases in overall regional and local traffic. Traffic increases may require improvements to the transportation infrastructure such as traffic controls, new roads, road widening, and bridges. Traffic increases also may degrade local air quality.

The expected impacts to transportation would be expected to be concentrated in the areas near the Los Alamos townsite and LANL area rather than be distributed throughout the region. Implementation of the various conveyance or transfer scenarios would be an important contributor to cumulative impacts in this area. An increase in local traffic would be expected for land tracts undergoing development. Peak hourly traffic would likely increase in 6 of the 10 parcels by 751 to 3,775 vehicles. The largest increases would be associated with further development of the Airport Tract from approximately 278 to 1,554 vehicles during the peak traffic period. Areas transferred for cultural preservation would expect a decrease in local traffic due to increased access restrictions.

15.3.3 Infrastructure

Cumulative impacts to infrastructure and utilities are assessed by comparing the current capacities of utility systems and infrastructure with utility demand and infrastructure requirements of reasonably foreseeable future regional projects and activities. Important cumulative impacts occur when the net effect of incremental impacts of the proposed action, added to those of other past, present, and reasonably foreseeable future actions, would create demand in excess of utility capacities and would require extensive expansion of infrastructure.

Potentially important cumulative impacts to regional utilities and infrastructure have been identified. The increase in peaking demand for electricity would be expected to exceed the capacity of the electrical power system. Water usage would be projected to exceed water rights. Delivery systems for gas may need to be upgraded to handle increased demand. The capacity of the Bayo Wastewater Treatment Plant would be expected to be exceeded. Solid waste production would be expected to reduce the expected life of the regional landfill.

A description of utility infrastructure is presented in Chapter 3, Affected Environment. System capacities, current and anticipated utility use, and waste generation associated with LANL, other regional developments, and the conveyance and transfer scenarios are included in Table 15.3.3-1.

The system capacities for the various utilities are reiterated here for comparison. Note that many of the numbers are "bounding" numbers; in other words, they are the highest usage that could realistically be expected. The cumulative usage on the transferred tracts represents the maximum utility usage associated with the contemplated land uses for each tract. Note also that the disposition of the tracts and any subsequent development would occur over the course of 10 years, so impacts to utility systems would not be immediate.

The contemplated developments on these lands would increase the electricity peaking power demand by 6 megawatts and the electrical energy usage by 32 gigawatt-hours. Other developments in the County would increase the peaking power demand by 2 megawatts to a total of 16 megawatts and increase electricity usage by 12 gigawatts to a total of 106 gigawatts. Projected LANL developments would create an additional power demand of 5 megawatts and energy usage of 65 gigawatts. The total increase in

Table 15.3.3-1. Cumulative Utility Usage Projections versus Existing Capacity

	POWER mw	ELEC. gwh	GAS mcf (mly)	WATER mgy (mly)		SEWAGE mgy (mly)			SOLID WASTE tpy (mty)[a]
				COUNTY	LANL	SWSC	BAYO	WHITE ROCK	
System Capacity	107	860	8,100 (229,400)	1,260 (4,770)	540 (2,044)	220 (833)	500 (1,893)	300 (1,136)	
Current Usage[b]									
LANL[c]	95	628	2,020 (57,200)	---	693 (2,624)	187 (708)	---	---	2,700 (2,600)
County + BNM	14	94	1,040 (29,500)	963 (3,645)	---	---	365 (1,382)	146 (553)	15,990 (14,500) [c]
SUM	109	722	3,060 (86,700)	963 (3,645)	693 (2,624)	187 (708)	365 (1,382)	146 (553)	18,690 (17,100)
Remaining Capacity[e]	-2	215	5,040 (142,700)	297 (1,125)	-153 (-579)	33 (125)	135 (511)	154 (583)	7 years
LANL Developments									
Expanded Operations[b]	5	65	0 (0)	---	47 (178)	0 (0)	0 (0)	0 (0)	300 (272)
Remaining Capacity[e]	-7	150	5,040 (142,700)	297 (1,125)	-200 (-758)	33 (125)	135 (511)	154 (583)	6.8 years
County Developments									
Transferred Land	6	32	459 (13,000)	382 (1,446)	---	0 (0)	132 (500)	41 (155)	2,385 (2,163)
Current developments	1	8	170 (4,810)	131 (496)	---	0 (0)	60 (227)	5 (19)	1,176 (1,067)
Research Park	1	4	43 (1,220)	17 (64)	---	12 (45)	0 (0)	0 (0)	200 (181)
Española growth[f]									455 (413)
SUM	8	45	672 (19,030)	530 (2,006)	---	12 (45)	192 (727)	46 (174)	4,216 (3,824)
Remaining Capacity[e]	-15	105	4,368 (123,670)	-233 (-881)	-200 (-758)	21 (80)	-57 (-216)	108 (409)	5.5 years

Notes: mw = megawatts, gwh = megawatt-hours, mcf = million cubic feet, mly = million liter per year, mgy = million gallons per year, tpy = tons per year, mty = metric tons per year

[a] Remaining capacity of landfill estimated at 7 years (130,000 tons [120,000 metric tons] at current disposal rates).

[b] Includes 20 mgy at the Strategic Computing Complex (SCC), which is not reflected in the SWEIS. The SWEIS assumes 100% of SCC water needs are met with treated wastewater. In the CT EIS a more conservative assumption is used. It is assumed that only two-thirds of the SCC water needs are met by recycled wastewater with the remaining third met by fresh water.

[c] No Action Alternative from the SWEIS. Figures reflect a decrease in anticipated peak power at the LEDA Facility.

[d] Includes solid wastes from Los Alamos County, Española, and Santa Clara Pueblo.

[e] Difference from contract limits or physical capacity.

[f] Based on growth of Rio Arriba County in the LANL SWEIS.

peaking demand from all future developments would be expected to exceed the peaking power capacity of the electrical system by 15 megawatts.

The increase in natural gas usage for developments in the County and at LANL is shown in Table 15.3.3-1. It is not anticipated that these developments would exceed the capacity of the regional delivery system. However, some segments of the local delivery system may need to be upgraded to handle the increased demand.

As shown in Table 15.3.3-1, Los Alamos County water use resulting from contemplated developments on dispositioned land would be expected to increase by 382 million gallons (1,446 million liters) per year. Other County developments would increase water usage by an additional 148 million gallons (560 million liters) per year, bringing the total County increase to 530 million gallons (2,006 million liters) per year. Under the proposed 70/30 split of water rights between the County and the DOE, these developments would cause the County to exceed their water rights by an estimated 233 million gallons (882 million liters) per year. The projected increase in water usage for LANL is 47 million gallons (178 million liters) per year. Based on these projections, the DOE (LANL) would exceed its share of the water rights by 200 million gallons (757 million liters) per year. If the County were to address this increased demand by the installation of new water supply wells, then the placement and operation of these wells could impact water quality.

Wastewater treatment at the Bayo Wastewater Treatment Plant would increase by 132 million gallons (500 million liters) per year from developments on dispositioned lands (not including developments on the White Rock Tract, which would pipe sewage to the White Rock Wastewater Treatment Facility). Proposed and ongoing developments in the County would produce an additional 60 million gallons (227 million liters) of effluent annually to be treated at the Bayo Wastewater Treatment Plant. The total estimated increase would be 192 million gallons (727 million liters) per year, which would cause the capacity of the Bayo Wastewater Treatment Plant to be exceeded by 57 million gallons (216 million liters) per year. Increases in wastewater to the LANL Sanitary Waste Systems Consolidation (SWSC) Plant and the White Rock Wastewater Treatment Facility would not be expected to exceed the rated capacities.

Solid waste production would increase by 2,385 tons (2,163 metric tons) per year as a result of developments on transferred lands, as shown in Table 15.3.3-1. An additional 1,376 tons (1,248 metric tons) per year would be generated from other developments in the County, and another 455 tons (413 metric tons) per year would be expected from growth in Española. LANL solid waste production is expected to increase by 300 tons (272 metric tons) per year from the SWEIS Expanded Operation Alternative and development of the Strategic Computing Complex (SCC). LANL solid waste projections do not include wastes generated by planned environmental restoration activities. The disposition of environmental restoration wastes is not known at this time. However, all wastes would be managed according to applicable regulations and permits and according to the decisions made based on the DOE's WM PEIS. The total increase in solid waste production of 4,516 tons (4,098 metric tons) per year would reduce the life of the landfill from 7 to 5.5 years. The County has decided to close the current landfill and is planning the development of a new regional solid waste facility (PC 1999c). Increases in solid waste production may require accelerating the development of the new facility.

15.3.4 Noise

Cumulative noise impacts are assessed by determining the increases in levels of noise anticipated to be generated by the contemplated land uses and from construction related to the development of the tracts. Important cumulative impacts occur when the net effect of regional projects or activities would cause a noticeable and adverse increase in ambient noise levels or if construction causes excessive noise and vibrations.

Past and present noise sources and levels are described in Chapter 3, Affected Environment. Noise and vibration from LANL activities are expected to increase slightly during construction and operation of new facilities and due to increased frequency of high explosives testing. Other anticipated noise sources would include construction noise associated with housing, commercial and industrial projects, and increases in ambient noise associated with use of these facilities and residences and vehicle traffic. Similar potential changes would occur under the conveyance or transfer scenarios.

Cumulatively, ambient noise would increase in local areas, especially during construction, but would not add appreciably to overall noise levels. In most tracts, noise would occur more often than at present. Areas designated for cultural preservation and natural areas would experience similar levels of noise or slight decreases in ambient noise levels.

15.3.5 Visual Resources

Important cumulative impacts occur when the net effect of regional projects or activities would adversely affect scenic quality from a regional perspective.

Regional visual resources are described in Chapter 3, Affected Environment. Visual resources are not expected to change due to future LANL activities except for increases in lighting associated with a transportation corridor. Residential, commercial, and industrial development in undisturbed areas could degrade views and would increase ambient light visible in the night sky in the region. Similar visual changes could occur under the various conveyance or transfer scenarios.

As more undisturbed lands are developed, there would be some cumulative impact on visual resources, especially in the vicinity of LANL, Los Alamos, and White Rock. This reduction in visual quality would probably not be substantial on a regional scale; but, diminished viewsheds could impact resources important to maintaining a positive visitor experience on adjacent NPS lands. The maintenance of viewsheds from BNM have been identified as critical to the management mission of BNM. The negative effects on viewsheds of regional development and increased lighting of the night sky would be considered to be very important regional impacts. Implementation of conveyance or transfer scenarios in currently undeveloped areas would be an important component of the intensity of these potential impacts. Conveyance and transfer scenarios in previously developed areas on several tracts could positively impact visual resources by replacing less visually appealing structures with more visually compatible industrial and commercial structures. Areas designated for cultural preservation and natural areas would experience similar levels of visual resources as currently enjoyed or slight improvement.

15.3.6 Socioeconomics

Cumulative socioeconomic impacts are assessed by comparing baseline conditions with anticipated regional changes in population, employment, and expenditures expected as a result of reasonably foreseeable projects and activities. Important cumulative socioeconomic impacts occur when the net effect of regional projects or activities would substantially alter the location and distribution of regional populations,

substantially raise the unemployment rate, substantially affect the local housing market, or result in the need for new school services.

Because of its unique history, Los Alamos County has long been economically dependent on transfer payments from the DOE. These payments have ended. The DOE is transferring municipal facilities, functions, and lands to contribute to the economic self-sufficiency of the County.

Past and present socioeconomic conditions are described in Chapter 3, Affected Environment. LANL activities account for an estimated one third of employment, wage and salary, and business activity in the Los Alamos, Rio Arriba, and Santa Fe Counties. LANL is expected to increase employment of full-time equivalent employees by 2,186 over 1995 and area population would likely increase by 4,230 people. Other regional developments such as the Research Park, which is expected to employ 1,600 people, and other commercial and industrial developments would increase local employment and wage levels. Residential construction also would be expected to increase temporary construction employment and provide housing for anticipated population increases.

Under the various conveyance or transfer scenarios, similar developments are planned and would be expected to increase employment and wage levels and to contribute to population growth regionally. Depending on the scenarios implemented, 320 businesses could be developed on the tracts, employing up to 6,080 workers and generating a total of 8,957 jobs within the ROI. As many as 2,360 residences could be placed on the tracts, increasing White Rock and Los Alamos population by 6,620 residents.

Expected cumulative impacts to regional socioeconomics would include positive population, employment, and economic growth within the ROI. The contribution of the conveyance or transfer of the subject tracts to regional socioeconomic impacts would be likely be short-term economic gains from construction. Long-term gains would include increased levels of employment and wages and an increase in locally available housing to match projected population growth. Regional development would contribute to economic self-sufficiency but would not be expected to replace the loss of transfer payment funds, according to information provided by the County (see Chapter 18, Section 18.1).

15.3.7 Ecological Resources

Cumulative impacts to ecological resources are assessed by comparing the impacts on watersheds, vegetation, fauna, and habitat used by threatened and endangered species anticipated by the conveyance and the contemplated land uses with impacts associated with other regional projects and activities. Important cumulative impacts could occur when the net effect of regional projects or activities result in harm, harassment, or destruction of protected species; the fragmentation, or loss of sensitive habitat and breeding areas; and the loss of substantial numbers of individuals of native plant or animal species.

Regional ecological resources are described in Chapter 3, Affected Environment. Projected LANL activities would include the removal of up to 41 acres (17 hectares) of pinyon-juniper habitat and 7 acres (3 hectares) of ponderosa pine-Gambel oak habitat. Regional projects include the development of an undetermined amount of previously undisturbed plant and animal habitat. Under the conveyance or transfer development scenarios, approximately 826 acres (335 hectares) would be developed or redeveloped, resulting in the direct loss of approximately 770 acres (312 hectares) of ponderosa pine forest and pinyon-juniper woodland. Development would be expected to degrade large amounts

of adjacent habitat near the developed portions of the tract.

Potentially important cumulative impacts to regional ecological resources include a net loss and fragmentation of existing watersheds, migration routes, and habitat from development, which would also contribute to the deterioration of adjacent habitat. Development projects in the region would be expected to cause the direct mortality of less-mobile species during construction and through habitat loss and force the relocation of mobile species into areas with limited carrying capacities. Increased human use of habitat areas in the region due to better access, residential development, and sanctioning of recreational uses could disturb breeding and nesting areas and increase the damaging impacts of domestic pets. The additional fragmentation of land ownership would hinder efforts for regional resource planning by watershed or ecosystems. The loss of habitat and alteration of travel routes could result in an increase in automobile accidents involving vehicles and animals and property damage caused by animals.

While cumulative impacts to ecological resources would affect only a small percentage of the total region, many of the anticipated impacts from actions would be concentrated in the vicinity of Los Alamos, LANL, and White Rock. Implementation of the conveyance or transfer scenarios, especially those contemplated for the Rendija Canyon Tract, could be important contributors to cumulative impacts in this area. The largest loss would be associated with development in the Rendija Canyon Tract of approximately 570 acres (359 hectares). For the American peregrine falcon and Mexican spotted owl, approximately 4 percent of available preferred habitat from current DOE lands would be lost.

15.3.8 Cultural Resources

Cumulative impacts to cultural resources are assessed by weighing the anticipated impacts on prehistoric, historic, and traditional cultural properties (TCPs) resources related to the conveyance and transfer of the tracts and the contemplated land uses with impacts associated with other regional projects and activities. Important cumulative impacts occur when the net effect of regional projects or activities would result in the destruction, alteration, isolation, neglect, loss of protection, or the introduction of visible, audible, or atmospheric elements out of character with the resource. Because cultural resources are considered nonrenewable, each loss contributes to a decrease in the existing regional resource base, or, in the case of TCPs, a loss of a part of the cultural or spiritual heritage of a group or individual.

An overview of the cultural resources in the region is described in Chapter 3, Affected Environment. Planned LANL construction activities and explosives testing may affect up to 15 archaeological sites and other properties eligible for the National Register of Historic Places, but these impacts will be addressed by the *National Historic Preservation Act* Section 106 consultation process. Other regional development projects would involve ground disturbing activities; but, it is not known whether cultural resources would be or have been affected by these projects. Conveyance or transfer could remove over 4,800 acres (1,994 hectares) of land from certain Federal cultural resource protections. Development of approximately 826 acres (335 hectares) could result in adverse effects to cultural resources on the tracts and in adjacent areas.

It is possible that implementation of these projects could result in additional important cumulative impacts to the regional resource base and/or disruption of Native American or other cultural practices. Potential cumulative impacts would include destruction, alteration,

or isolation of prehistoric, historic, or TCP resources or the introduction of elements out of character with their setting. Residential development and increased access by the public could cause possible destruction or damage of resources, vandalism, unauthorized collection of materials and artifacts, and disturbance of traditional practices and ceremonies. Negative impacts to very important cultural resources on adjacent NPS and USFS lands would be likely due to increased access opportunities. Adjacent development and subsequent increased access and visitation to BNM and the Santa Fe National Forest would likely seriously impact the ability of these land-managing agencies to provide for the protection and interpretation of important cultural resource sites.

Because the extent of cultural resources affected by other regional projects is unknown and resources present would be subject to less protection when the tracts are conveyed or transferred, it is difficult to assess the contribution to overall cumulative impacts. Conveyance or transfer scenarios would potentially impact a large number of cultural resources in the immediate vicinity of LANL but not in the overall region.

15.3.9 Geology and Soils

Cumulative impacts to geology and soils are assessed by comparing the impacts on slope stability, soils, mineral resources, seismic risk, and the release of soil-borne contaminants based on the contemplated land uses with impacts associated with other regional projects and activities. Important cumulative impacts occur when the net effect of regional projects or activities would result in large-scale slope instability, erosion, or loss of prime agricultural or mineral resources.

The geology and soils of the region are described in Chapter 3, Affected Environment. No specific changes to soils or impacts would be anticipated for upcoming LANL activities. Other anticipated regional changes would include some soil disturbance due to construction in previously undisturbed areas. Under the conveyance or transfer scenarios, over 826 acres (335 hectares) of soil could be disturbed due to development, as described in Chapter 5 through Chapter 14.

Cumulative effects to geology and soils would be minor on a regional basis. Implementation of the conveyance or transfer scenarios would contribute to ground disturbance and potentially increase soil erosion.

15.3.10 Water Resources

Cumulative impacts to water resources are assessed by comparing the impacts on surface water and groundwater quantity and quality associated with the contemplated land uses and the impacts of reasonably foreseeable regional projects and activities. Important cumulative impacts occur when the net effect of regional incremental impacts would increase flood potential or could affect surface water or groundwater quality or quantity. Important cumulative impacts also would occur if Federal, State, or local regulatory requirements were violated by the combined impacts of regional projects or activities.

The water resources of the region are described in Chapter 3, Affected Environment. Current and projected water use is described in Table 15.3.3-1. No specific future LANL activities are expected to change surface water quality; but, water use is expected to increase. Other anticipated regional developments would be expected to increase groundwater demand and increase impermeable surfaces (such as parking lots and paved roads), affecting both the amount of runoff and the transport of contaminants. Full implementation of the conveyance or transfer development scenarios also would

increase water demand and impermeable surfaces.

15.3.10.1 Water Quantity

Cumulative impacts to surface water quantity from the increased developed areas would be expected to be inconsequential. Cumulative impacts to groundwater quantity and quality from the increased developed areas could be substantial. Currently, water levels in the regional aquifer are declining. Development of tracts under the contemplated land uses would increase the potential number of residents by about 30 percent. The additional water withdrawal associated with these development scenarios, coupled with the LANL SWEIS Preferred Alternative of a 30 percent increase in water withdrawal from the main aquifer, could seriously impact the amount of available, cheaply treatable water for both Los Alamos County and LANL.

15.3.10.2 Water Quality

Cumulative impacts to surface water quality from the increase in developed areas would be expected to be relatively minor in relation to the current size of the Los Alamos and White Rock townsites and the variety of commercial and industrial businesses historically operated in the area. Surface water quality within or near tracts may be affected temporarily where proposed construction and development is to take place. Surface water quality may be affected on a long-term basis by the introduction of contaminants via stormwater runoff from the additional developed commercial, industrial, and parking areas.

Cumulative impacts to groundwater quality could result from the placement and operation of new water supply wells that could be installed in order to address increased demand. Decreases in groundwater quality could result in impacts to human health.

15.3.11 Air Resources

Cumulative impacts are assessed by weighing the air quality impacts associated with the conveyance and transfer of the tracts and the contemplated uses by the receiving parties with any air quality impacts expected from other regional projects and activities. Important air quality impacts occur when the net effect of regional projects or activities would have the potential to increase regional criteria, hazardous, and radioactive air pollutant concentrations in excess of Federal air quality and other standards. Emissions also may contribute to global climate change.

The air resources of the region are described in Chapter 3, Affected Environment. Planned LANL activities would not be expected to exceed or approach applicable health-based standards for criteria or toxic air pollutants; but, there may be increases in mobile sources due to increased employment. Increased automobile, heating, and industrial emissions would be expected with new regional development, which could contribute to global climate change. Implementation of the conveyance or transfer scenarios would generate similar kinds of emissions.

The EPA has identified seven criteria pollutants, and New Mexico three more. New Mexico Air Quality Region 3, consisting of Los Alamos and other counties, currently meets all standards for criteria pollutants. Transfer of the 10 tracts, and subsequent development of some of them, would result in slight increases in criteria pollutants from mobile sources and the heating of homes and commercial and industrial buildings. These additional emissions, however, would not have a significant impact on the air quality of the region, and Region 3 would continue to meet national and State air quality standards for criteria pollutants.

Hazardous and toxic chemical air pollutants are currently emitted in small quantities as a result of LANL research and

other activities. Concentrations of these pollutants, however, do not exceed health-based standards for any point beyond LANL boundaries (DOE 1999c), and no adverse health effects are expected. Transfer of the 10 tracts, and subsequent development of some of them, would not be expected to result in additional emissions of such pollutants, but would bring members of the public closer to some LANL emission sources. However, concentrations would still not exceed health-based standards, and thus, no cumulative impacts would be expected.

Radioactive air pollutants in the region come from LANL operations, mostly from research and production activities at the LANSCE facility at TA 53. Emissions are within health limits imposed by the EPA and would be expected to remain so (DOE 1999c). Transfer of the 10 tracts and subsequent development of some of them would not result in any additional emissions of radioactive air pollutants, but would bring members of the public closer to LANL emission sources. This would slightly increase the collective radiation dose received by members of the public but would not change the maximum dose received by any single individual.

Visibility in the Los Alamos region is excellent. However, transfer of the 10 tracts and subsequent development of some of them would increase County population by as much as 30 percent. As discussed in Section 15.3.5, this development would result in increased lighting that would have a negative cumulative impact to views of the night sky, and could affect views in BNM.

Finally, development subsequent to the disposition of the 10 tracts would significantly increase regional emissions of greenhouse gases, which contribute to global climate change. Increased emissions, an estimated 40,000 tons [36,300 metric tons] of carbon dioxide annually, would result from additional personal and commercial vehicles and from the heating of new homes and commercial and industrial buildings. However, while this is significant from a regional perspective, contributions would be less than 0.001 percent of global emissions of these pollutants.

15.3.12 Human Health

Cumulative human impacts are assessed by weighing the human health and accident risks associated with the conveyance and transfer of the tracts and the contemplated uses by the receiving parties with any human health impacts expected from other regional projects and activities. Important human health impacts occur when the net effect of regional projects or activities would have the potential to affect regional human health by increasing the exposure to radiological or hazardous materials or increasing the risk of accidents or the danger of natural phenomenon such as fires, floods, or earthquakes.

Excluding the impacts of naturally occurring events, cumulative health impacts result primarily from LANL operations. Development of the subject land tracts would not be expected to contribute substantially to human health impacts in the region. As shown in Figure 5.3.4.2-1 in Chapter 5 of the LANL SWEIS (DOE 1999c), the estimated maximum dose resulting from expanded LANL operations is estimated to be 5.4 millirem per year; the estimated maximum dose to a resident of the Royal Crest Trailer Park is estimated to be 4 millirem; the dose to Los Alamos townsite residents range from 1 to 2 millirem; and a White Rock resident is estimated to receive less than 1 millirem. These exposures correlate to risks of excess latent cancer fatalities (LCFs) of 2.7×10^{-6}, 2×10^{-6}, 0.5 to 1.0×10^{-6}, and less than 0.5×10^{-6} per year of operation, respectively, under normal operation conditions.

The human health impacts resulting from hypothetical accidents and naturally occurring events would increase due to the potential increase in residents and workers closer to LANL operations. While it is understood that not all tracts will be fully developed, it was assumed that each tract would be populated to the maximum extent associated with the identified land uses. Should all of the tracts be developed with the maximum populations identified, the population dose and LCFs due to hypothetical accidents would increase approximately 70 percent over the 120,000 person-rem and 57 excess LCFs estimated in the LANL SWEIS. Similarly, the population dose and LCFs due to naturally occurring events would increase approximately 60 percent over the 340,000 person-rem and 230 excess LCFs estimated in the LANL SWEIS.

15.3.13 Environmental Justice

Cumulative environmental justice impacts are assessed by weighing the impacts associated with the conveyance and transfer of the tracts and the contemplated uses by the receiving parties with any environmental justice impacts expected from other regional projects and activities. Environmental justice impacts occur when the net effect of regional projects or activities would result in disproportionately high adverse human and environmental effects to minority or low-income populations.

Environmental justice issues are discussed in Chapter 3, Affected Environment. No environmental justice issues are anticipated for upcoming LANL activities, and no other regional activities are applicable. Under the conveyance or transfer scenarios, there would be potential cumulative impacts to minority or low-income populations based on impacts to TCPs. Consultations to determine the presence of these resources, the degree to which these resources may be impacted, and the possible effects on minority or low-income populations have not been completed. There also may be some tract-specific indirect effects on traditional wood gathering. Legal counsel for the Pueblo of San Ildefonso has expressed the opinion that there would be environmental justice impacts associated with the conveyance and contemplated uses of four of the subject tracts: Rendija Canyon, White Rock Y, TA 74, and the White Rock Tracts.

No cumulative impacts on minority or low-income populations would be expected. No adverse human health impacts would be associated with the conveyance and transfer or contemplated uses that would contribute to disproportionate impacts to minority or low-income populations.

15.3.14 Irreversible and Irretrievable Commitment of Resources

This section describes the major irreversible and irretrievable commitments of resources that can be identified at the level of analysis conducted for this CT EIS. A commitment of resources is irreversible when its primary or secondary impacts limit the future options for a resource. An irretrievable commitment refers to the use or consumption of a resource that is neither renewable nor recoverable for use by future generations.

The actual conveyance or transfer of the subject land tracts would not immediately cause any irreversible or irretrievable commitments of resources. The proposed land use scenarios would, however, cause irreversible commitments of ecological habitat, and potentially cultural resources, in land tracts where new development would occur.

Development of previously undeveloped areas also would cause the irretrievable commitment of resources during construction and operation of the residential, commercial, or industrial facilities. Energy would be expended in the form of natural gas and electricity. Additional water also would be consumed. Construction of these facilities would require the irretrievable commitment

of standard building materials such as roofing materials and concrete.

15.3.15 Unavoidable Adverse Environmental Impacts

The actual conveyance or transfer of the subject land tracts would not immediately cause any adverse environmental impacts. The proposed land use scenarios would, however, cause unavoidable adverse impacts to ecological habitat, and potentially cultural resources, in land tracts where new development would occur. The ecological impacts could include loss of habitat, fragmentation of habitat, and potential disruption of wildlife migration corridors. There also is potential for adverse impacts caused by introduction of land uses that are incompatible with adjacent resource protection efforts. The actual impact would be dependent on the specific resource in the adjacent area.

Conveying or transferring land tracts also could result in the loss of certain Federal protections for cultural resources on these tracts. Loss of these protections could be considered an unavoidable adverse impact to these resources, as this could lead to development of previously undisturbed areas. This development could result in physical destruction, damage, or alteration of cultural resources on the subject land tracts and in adjacent areas.

15.3.16 Relationship Between Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

The actual conveyance or transfer of the subject land tracts would not immediately cause any specific impacts or short-term uses of the environment. The proposed land use scenarios would, however, require short-term use of resources (for example, water, fuel, electricity, etc.) during construction and also cause permanent loss of ecological habitat and potential loss of cultural resources. An increase in residential, commercial, and limited industrial development would cause overall enhancements of the long-term productivity of the area. The environmental restoration activities at the subject tracts, while causing some short-term disruption and use of resources, provide for long-term improvement.